Astronomy & Physics Division Overview

Presented to

OS/SEUS

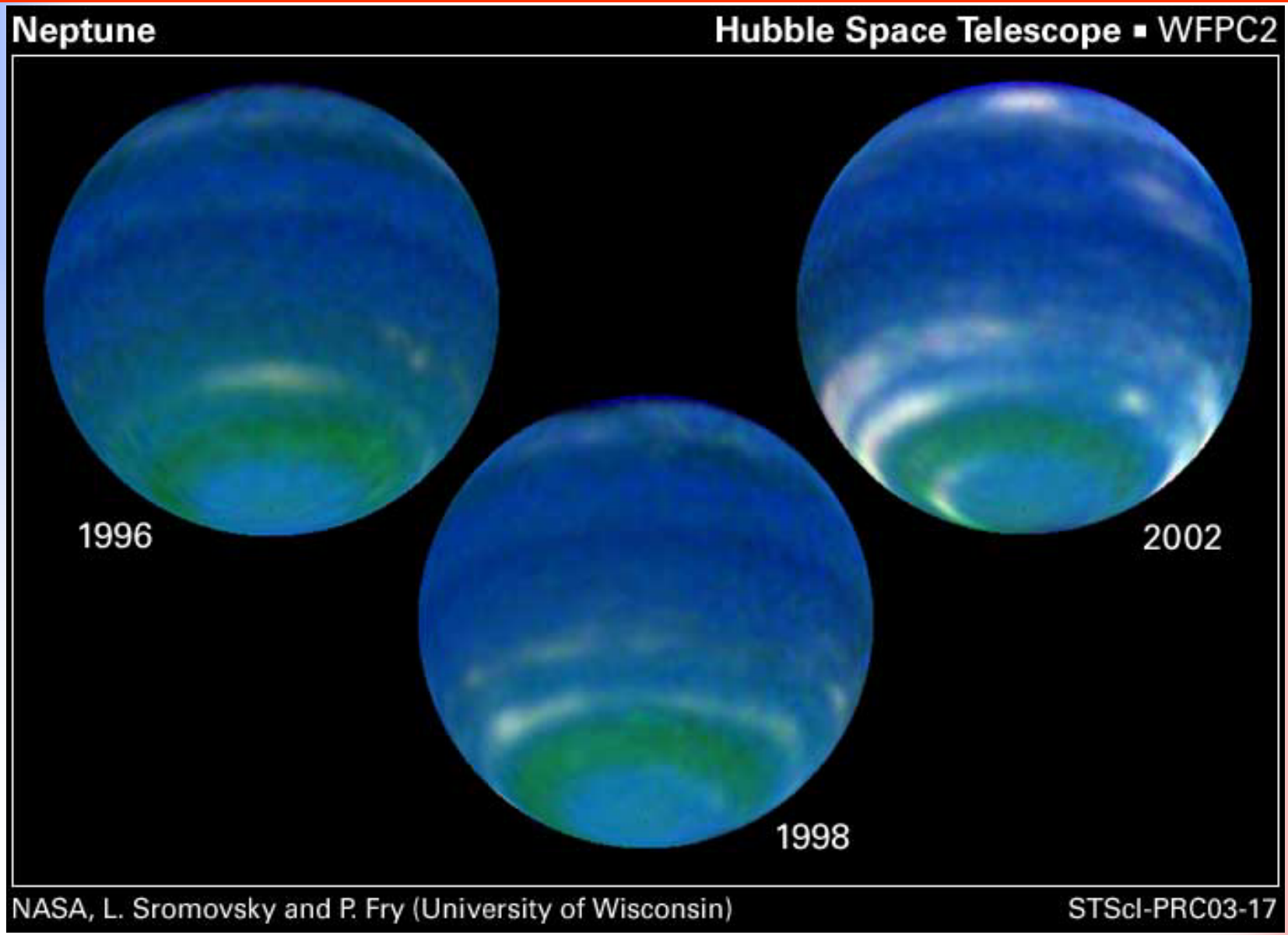
Dr. Anne L. Kinney
Director
Astronomy and Physics Division

July 1, 2003

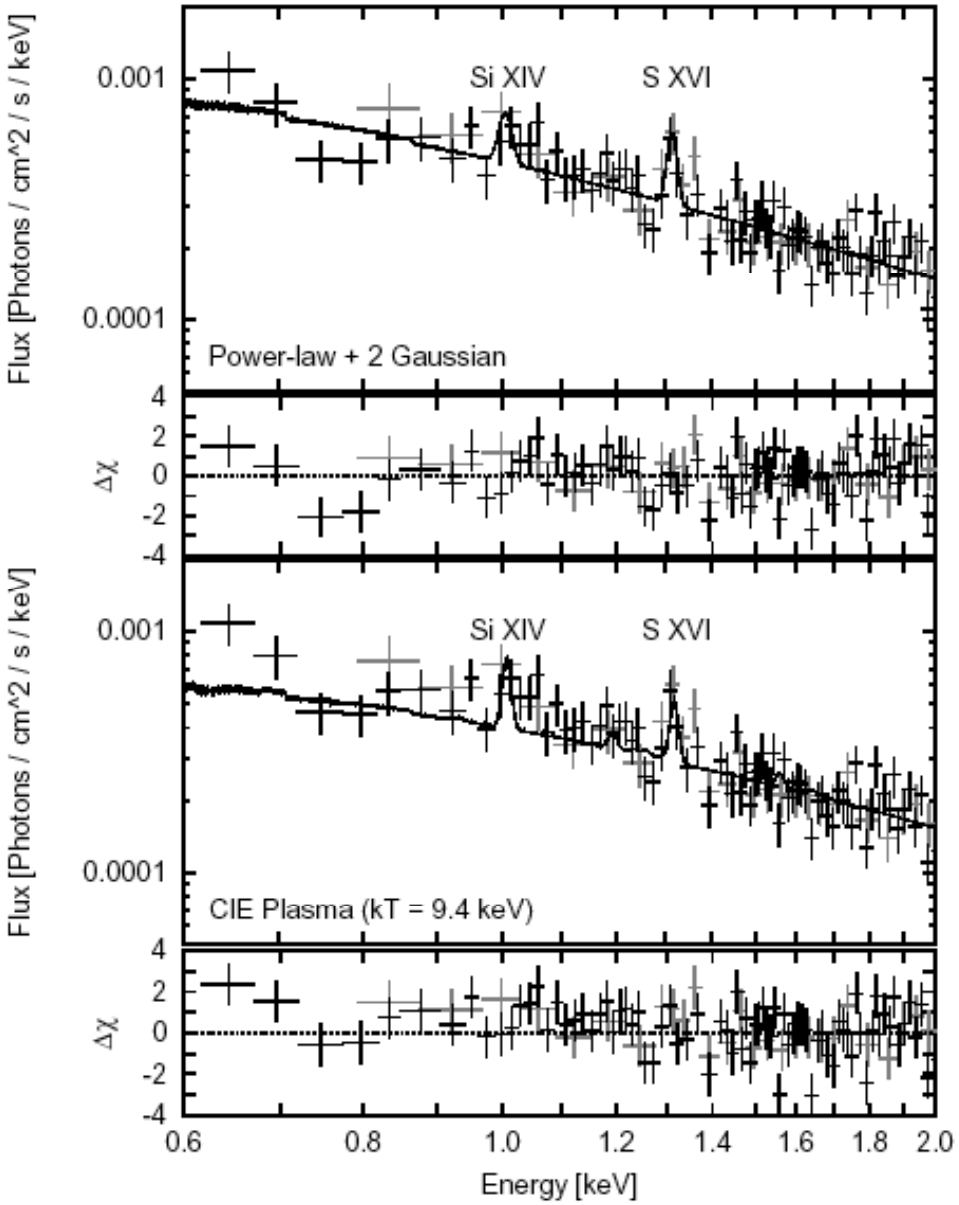
Introduction

- Beyond Einstein
- Fabulous Science and Press Results
- Launches
- Challenges/Solutions
- Reviews and Blue Ribbon Panel

Science Highlights:
HST: Planetary Change of Seasons



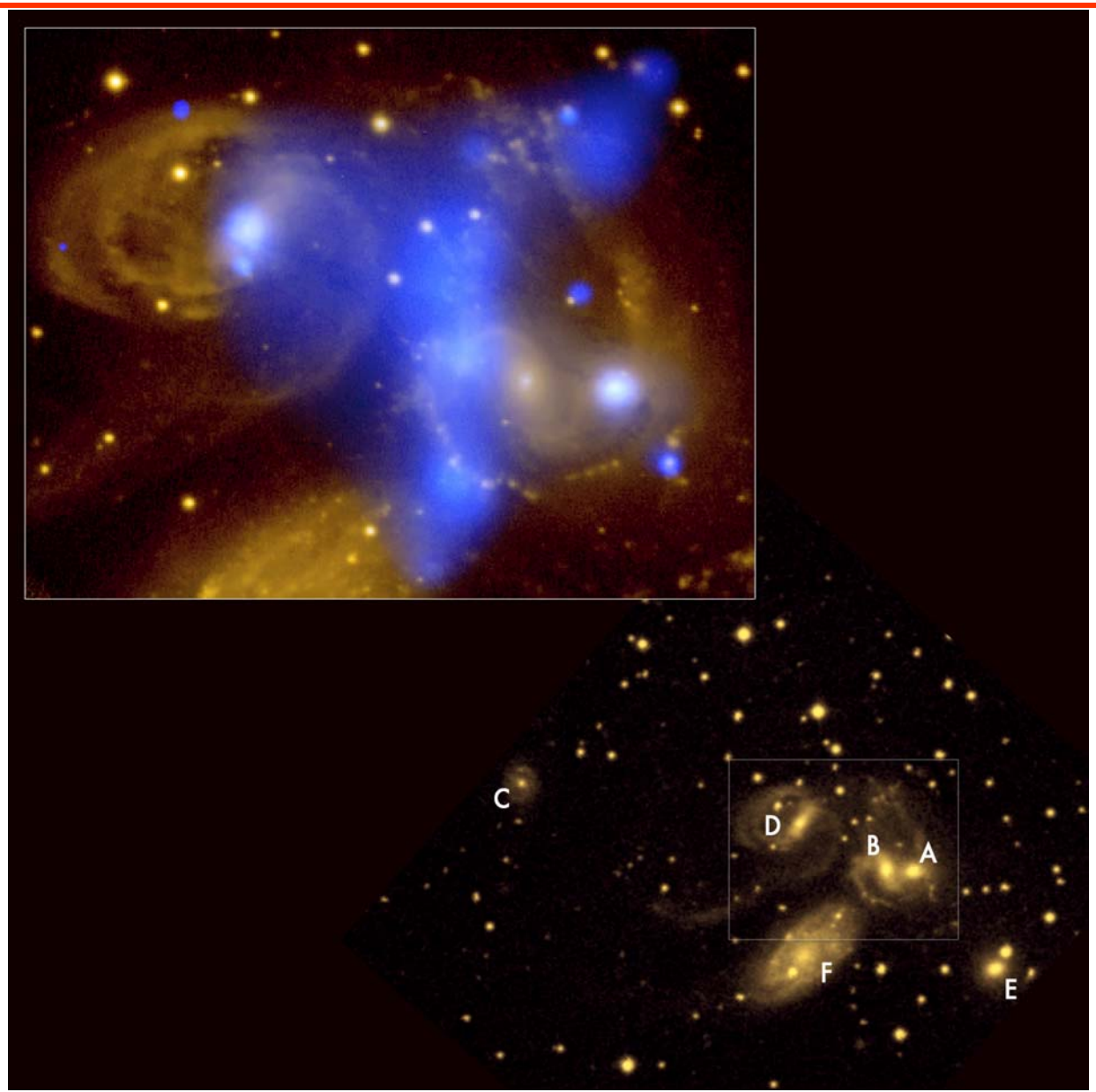
Science Highlights: HETE



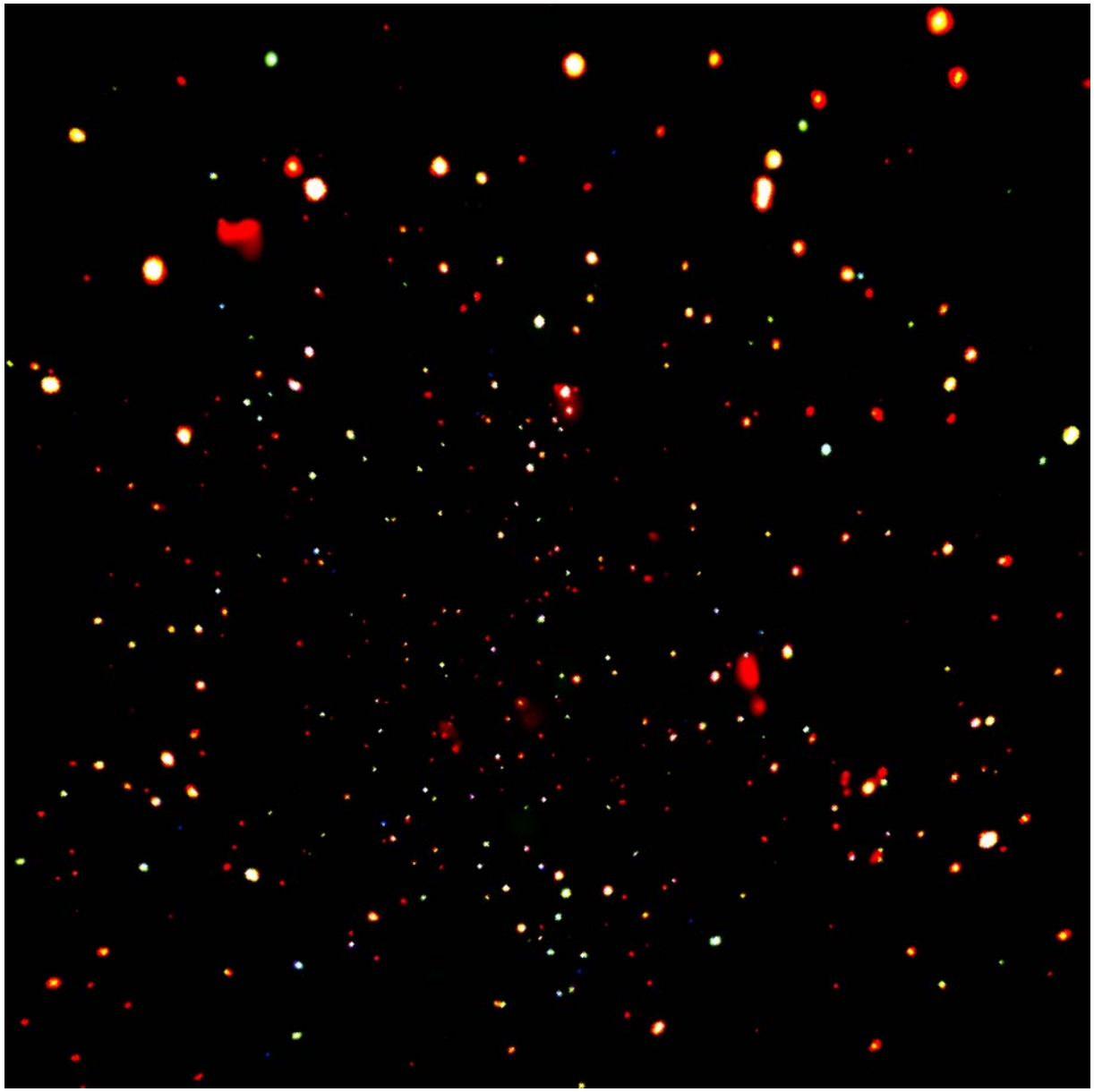
GRB Associated with Supernova

- GRB020813 is HETE detected long duration burst.
- Chandra HETGS spectral observations of afterglow.
- Low -z metals (S and Si) detected, but not Fe.
- Lines associate burst with a supernova.
- Lack of iron suggest burst occurred $\lesssim$ 2 months after supernova (Ni^{56} $\underset{6d}{\rightarrow}$ Si^{56} $\underset{78d}{\rightarrow}$ Fe^{56})

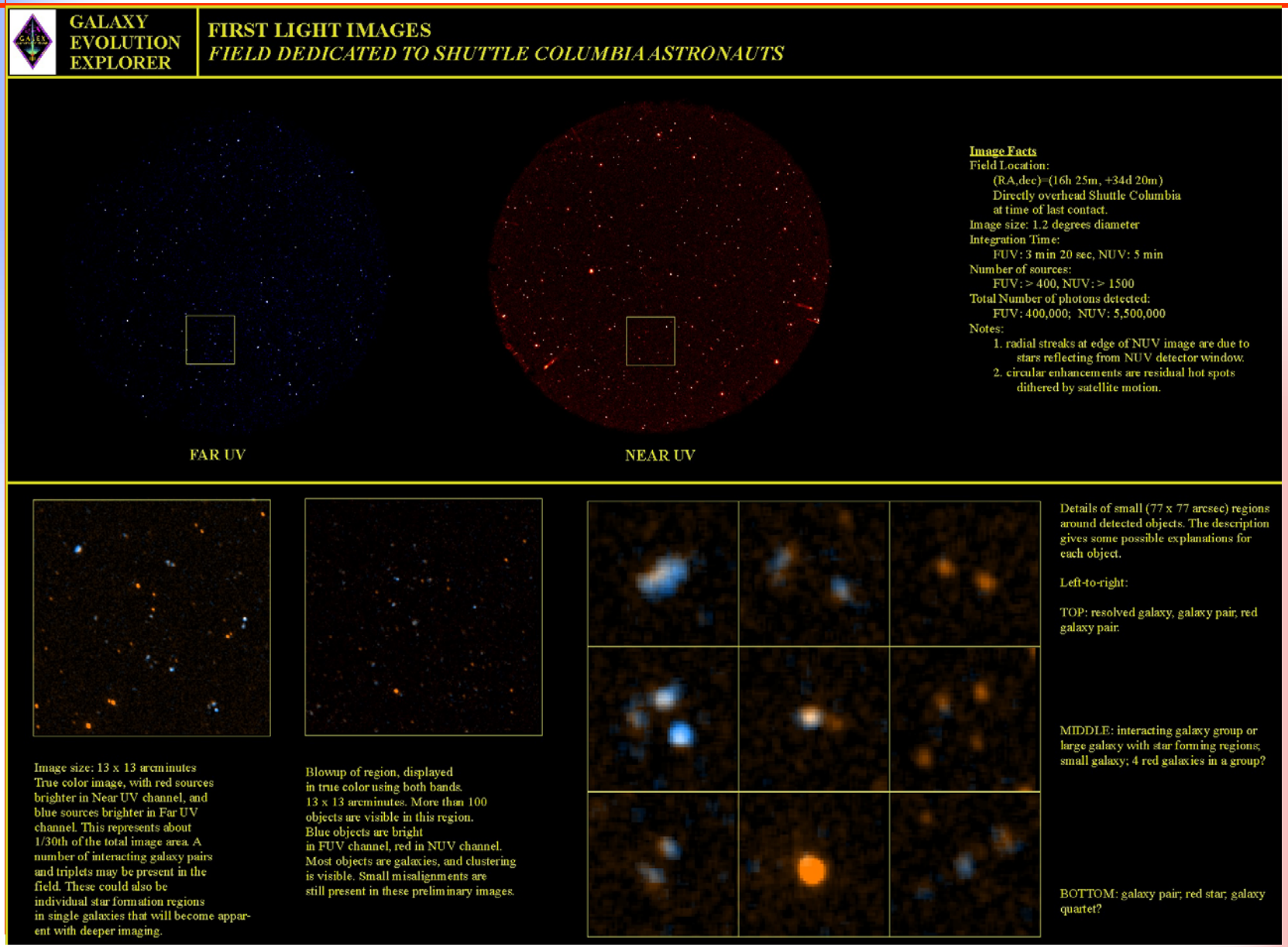
Science Highlights:
Chandra - Stephan's Quintet



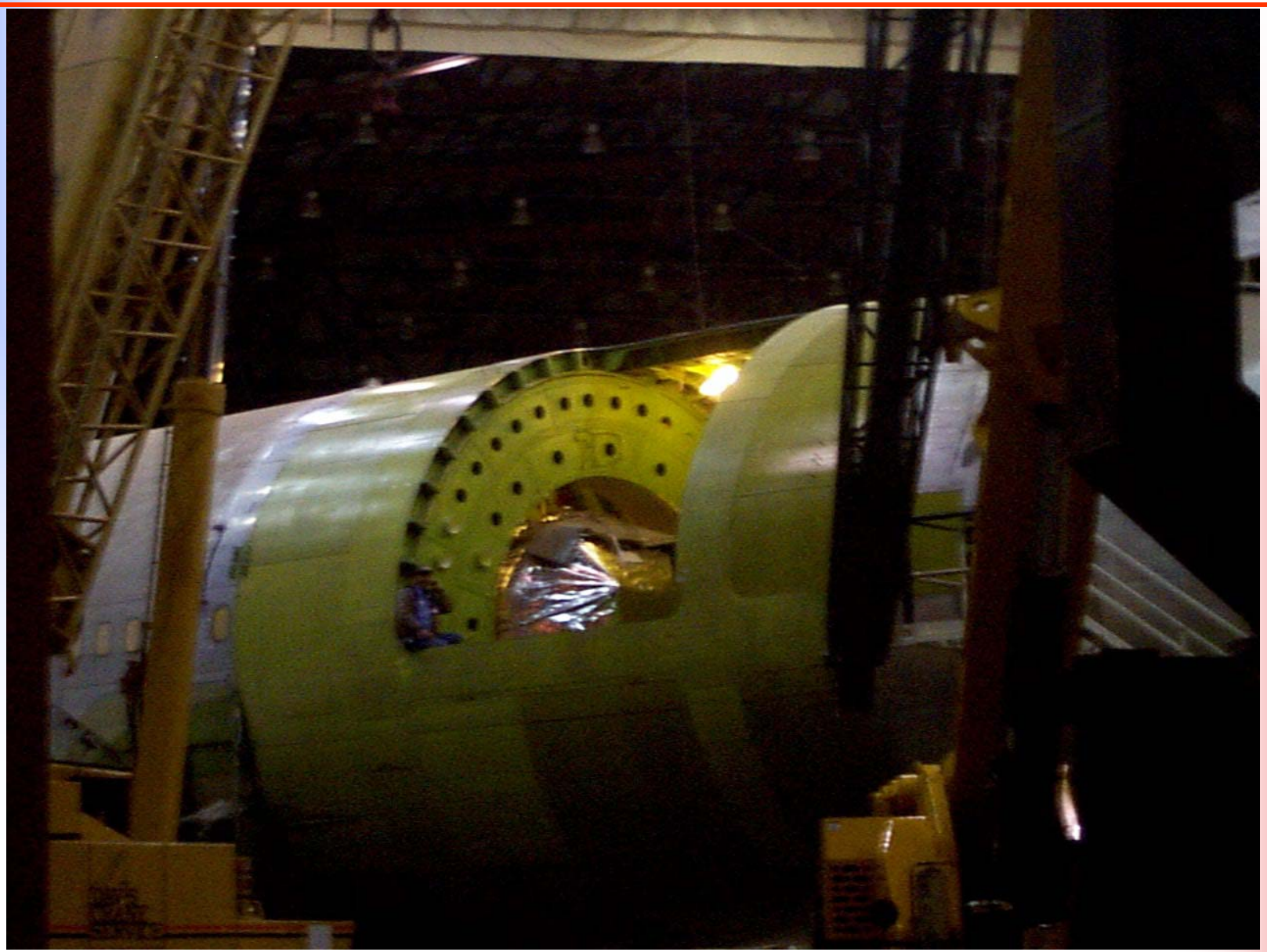
Science Highlights:
Chandra Deep Field North



Science Highlights:
GALEX First Light



Science Highlights:
SOFIA Telescope Support Installed



Space Science Updates

Chandra: Merging Supermassive Black Holes	November 19, 2002
WMAP: Universe's Baby Picture	February 11, 2003
HETE: Nearby Gamma Ray Burst	March 19, 2003
RXTE: Cosmic Speed Limit on Pulsars	July 2, 2003
Hubble: Planet related	July 10, 2003

Note:
6 SSU's in SEU this year.
5 SSU's in Origins this year.

2003 Space Science Launches

- CHIPSat - Launched from VAFB January 12.
- GALEX - Launched from CCAFS April 28.
- Mars Rover Spirit - Launched from CCAFS June 10.
- Mars Rover Opportunity - Scheduled from CCAFS July 2.
- SIRTF - Scheduled from CCAFS August 23.
- Gravity Probe B - Scheduled from VAFB NET November 20.
- SWIFT - Scheduled from CCAFS January 2004.
- CINDI - Scheduled from KWAJ January 23, 2004.

Upcoming Launch
Mars Exploration Rovers

Launches:

MER A (Spirit): NET June 10, 2003 √

MER B (Opportunity): July 2, 2003

Cape Canaveral, FL.

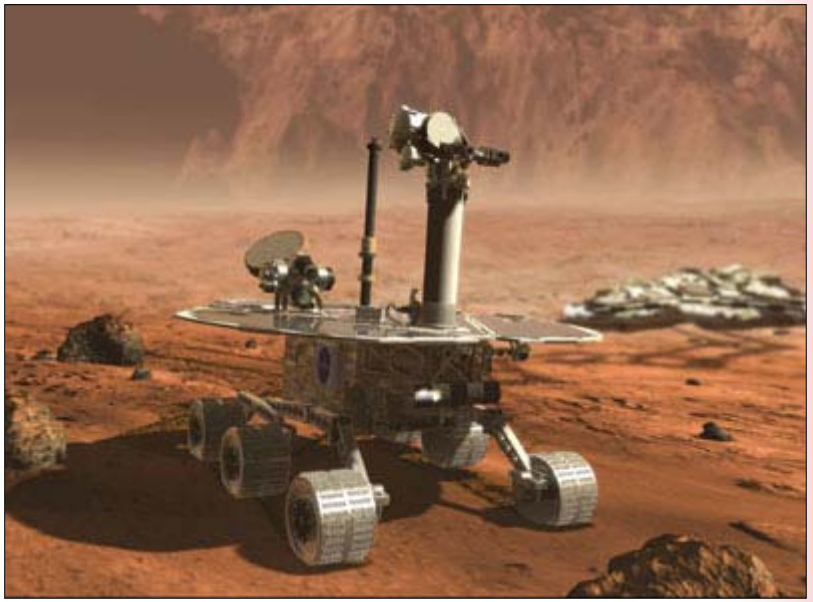
Launch vehicles:

Delta II

Primary Science Objective:

Looking for Signs of Past Water on Mars.

The big science question for the Mars Exploration Rovers is how past water activity on Mars has influenced the red planet's environment over time.



Upcoming Launch
SIRTF

Launch:

August 23, 2003
Cape Canaveral, FL.

Launch Vehicle:

Delta II Heavy

Primary Science Objective:

SIRTF will obtain images and spectra by detecting the infrared energy, or heat, radiated by objects in space.

Most infrared radiation is blocked by the Earth's atmosphere and cannot be observed from the ground.

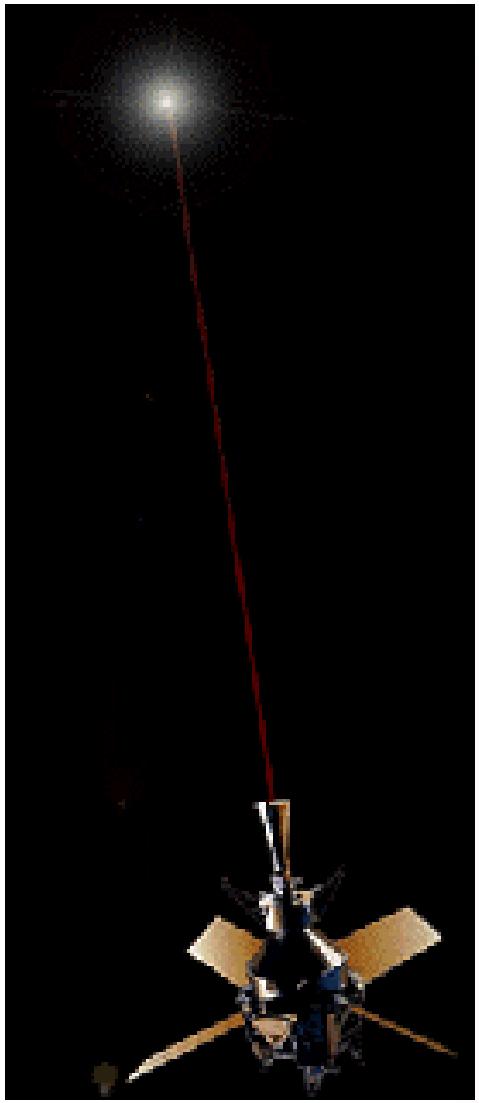
Upcoming Launch
GP-B

Launch:
November 20, 2003
VAFB, CA.

Launch Vehicle:
Delta II

Primary Science Objective:

Gravity Probe B uses four gyroscopes developed to test two predictions of Albert Einstein's general theory of relativity. While in a polar Earth orbit, it will measure how space and time are warped by the presence of the Earth, and how the Earth's rotation drags space-time around with it.



Upcoming Launch
SWIFT

Launch:
- January 2004
- Cape Canaveral, FL.

Launch Vehicle:
- Delta 7320

Primary Science Objective:

The primary objective of the SWIFT mission is to determine the origin of Gamma Ray Bursts and to use them to probe the early universe.

Astronomy and Physics
Operating Missions Status

	Launch/Phase	Apr	May	Jun	STATUS
HST	04/25/90 Prime	GRN	GRN	GRN	
Rossi XTE	12/30/95 Extended	GRN	GRN	GRN	
2MASS	04/01/97 Extended	GRN	GRN	GRN	
SWAS	12/3/98 Extended	GRN	GRN	GRN	
FUSE	06/24/99 Extended	GRN	GRN	GRN	
Chandra XO	7/19/99 Prime	GRN	GRN	GRN	High solar radiation event on 5/31 caused loss of 95 ksec science time. Cycle 5 review week of 6/22.
XMM-Newton	12/09/99 Prime	GRN	GRN	GRN	
HETE-2	10/08/00 Extended	GRN	GRN	GRN	
WMAP	06/30/01 Prime	GRN	GRN	GRN	
Integral	10/17/02 Prime	GRN	GRN	GRN	
CHIPS	1/15/03 Prime	GRN	GRN	GRN	
GALEX	4/28/03 Prime			GRN	

GRN Proceeding on Plan, only normal, minor problems

Structure and Evolution of the Universe
Developmental Mission Status

	Launch	Apr	May	Jun	STATUS
GP-B	**Nov '03**	**RED**	**YEL**	**YEL**	Completed penalty T/V, accessing results. Star tracker anomaly reoccured. SIM 5 went very well.
SWIFT	**Dec '03**	**GRN**	**YEL**	**YEL**	Launch date moved to January 15, 2004. BAT has no schedule reserve.
Astro-E2	**Feb '05**	**YEL**	**YEL**	**YEL**	XRS PER held June 19, 2003, XRT vibration anomaly being investigated.
SPIDR	**Jun '05**	**RED**	**BLK**		Termination Letter sent to PI and GSFC on May 16th.
GLAST	**Sep '06**	**GRN**	**YEL**	**YEL**	NAR successfully held June 3-5, 2003. Addressing findings.
Herschel	**2007**	**GRN**	**GRN**	**GRN**	SPIRE kevlar suspension system having manufacturing problems.
Planck	**2007**	**GRN**	**GRN**	**GRN**	Cryocooler meeting held with ESA. Potential solution developed.
EUSO	**2008**			**GRN**	Recently selected Explorer Mission of Opportunity for ESA ISS mission.
LISA	**2011**	**GRN**	**GRN**	**GRN**	List and mgmt meeting schedule for July 5-9, 2003 in Pisa, Italy.
Con-X	**2013**	**GRN**	**GRN**	**GRN**	All technology areas progressing well.
Balloons	**Ongoing**	**GRN**	**GRN**	**GRN**	Flew 70 marble Hall of Fame presentation gauges to replace set lost on Columbia.

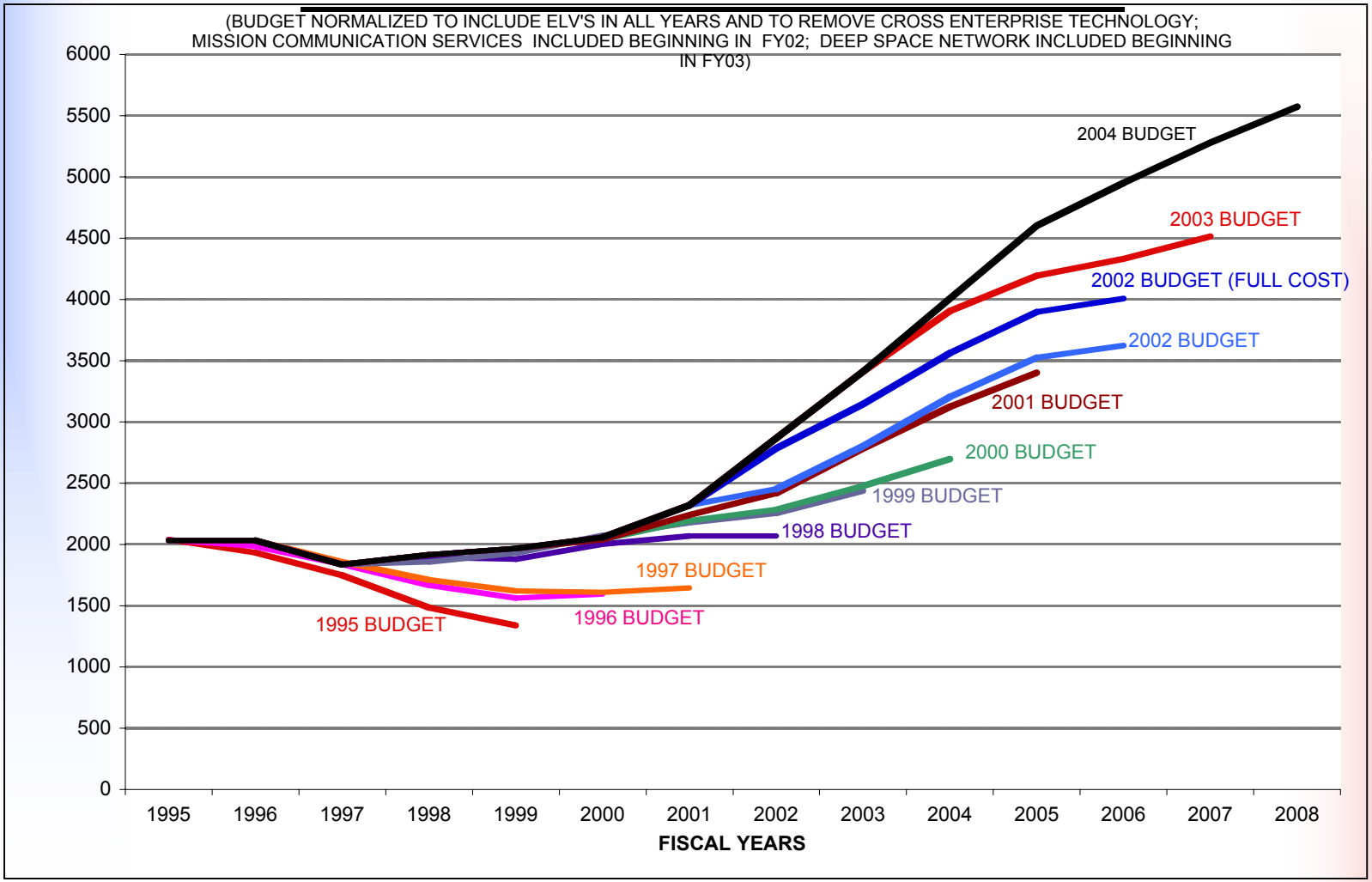
GRN	Proceeding on Plan, only normal, minor problems
YEL	Significant Problems or Concerns but feasible plan to resolve
RED	Major Problems; Solution path unclear

Astronomical Search for Origins
Developmental Mission Status

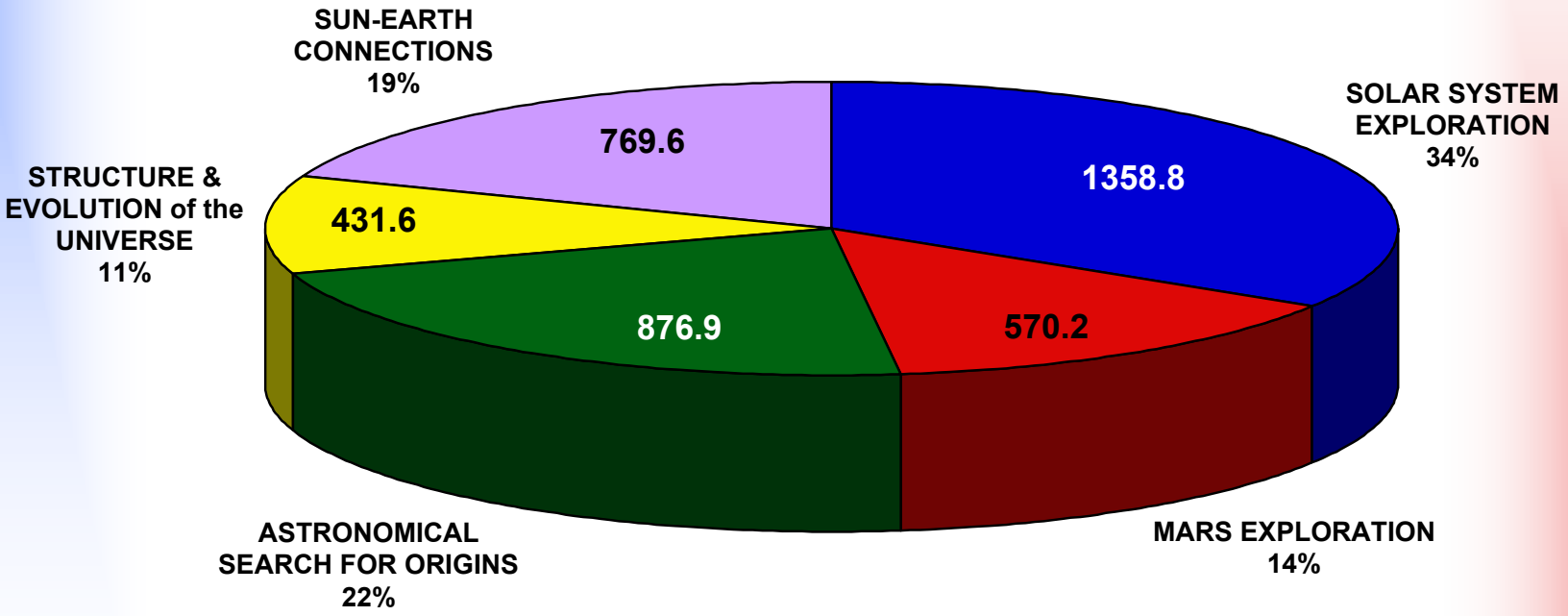
	Launch	Apr	May	Jun	STATUS
SIRTF	**Aug '03**	**GRN** **RED**	**GRN** **RED**	**GRN** **GRN**	Observatory ready for launch. Rocket booster delam process now in place for certification of flight worthiness.
HST	**Feb '05**	**YEL**	**YEL**	**YEL**	Lack of a defined launch date for SM4 introduces uncertainty in projected ability of the obs. to continue normal ops if date slips beyond late 2005.
SOFIA	**Apr '05**	**GRN**	**GRN**	**GRN**	First power-on activation of the telescope assembly achieved, plus rotation accomplished -- in position for primary mirror installation in July.
Keck Interferometer	**2005**	**GRN** **RED**	**GRN** **RED**	**GRN** **RED**	State Hearing Officer rec. granting permit upon approval of mgmt plan (by 12-31) 2nd sci paper (to *Nature* on MGC4151) in prep.
LBTI	**Sep '06**	**GRN**	**GRN**	**GRN**	PLRA in last comment rev cycle. Phase E, Commissioning & Ops & Maintenance, Confirmation Review scheduled for July 8, 2003.
Kepler	**2007**	**GRN**	**GRN**	**GRN**	Received evaluation grade CCD's from vendor.
SIM	**Dec '09**	**GRN**	**GRN**	**GRN**	ICR held June 18. Received OSS approval to proceed into Phase B.
JWST	**Aug '11**	**YEL**	**YEL**	**YEL**	Delta-MDR/Initial Confirmation Assessment: June 17-20. Working toward confirmation for Phase B.
TPF	**tbd**	**GRN**	**GRN**	**GRN**	Technology demonstration mirror and all cryocooler contracts have been successfully negotiated.

GRN	Proceeding on Plan, only normal, minor problems
YEL	Significant Problems or Concerns but feasible plan to resolve
RED	Major Problems; Solution path unclear

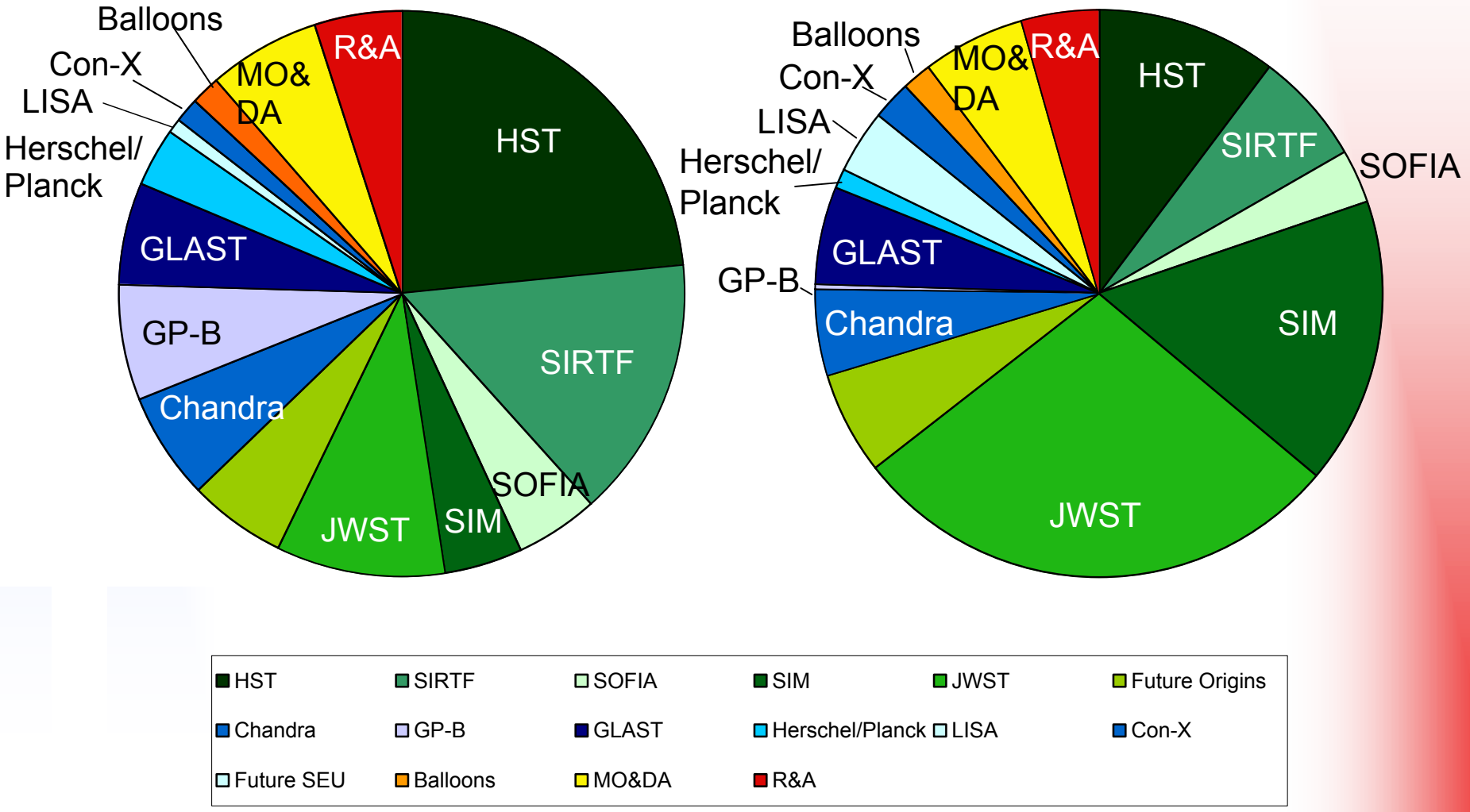
Space Science Budget History



Space Science Budget
Full-Cost FY04 President's Request



Astronomy and Physics
FY'03 vs FY'06 Budgets



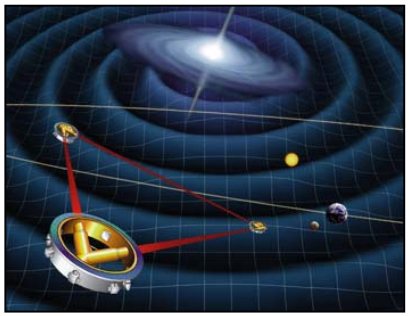
Space Science Budget
FY 2004 New Content

- Incorporates the existing NSI program and the new Jupiter Icy Moons Orbiter (JIMO) mission into a new initiative called Project Prometheus.
- Establishes an Optical Communications program, which enables revolutionary new data communications/transmission.
- Provides development funding for three key elements of the Beyond Einstein program: Constellation X, LISA and Einstein Probes.

Supports increased activity in priority programs

Beyond Einstein

- Significant expansion of efforts in NASA's Structure and Evolution of the Universe (SEU) theme, addressing its highest priorities as determined by the National Academy of Sciences' Decadal Survey.
- Funding for full development of two major missions: LISA and Constellation-X.



- Funding to initiate "Einstein Probes," a program that will begin later this decade.
  - this program consists of fully and openly competed missions (in the manner of the Discovery, Explorers, and New Frontiers programs) to conduct investigations that benefit the Beyond Einstein science objectives.